Thrusters

Contra-Rotating Propellers - Combination of DP Capability, Fuel Economy and Environment

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Pushing propeller

Ducted propeller

Dual-end CRP

Single-end CRP

Pulling propeller (podded)

Pulling propeller

Tandem propellers
DP Conference, 2006

Dual-end Contra Rotating Propellers
Power Sharing

Two gear contacts share the power

Power sharing contributes to slow, large propellers
Increased Propeller Area
Energy Retrieval

Retrieval of the rotation energy
Undisturbed Inflow

Pulling propeller
DP Conference, 2006

Undisturbed Inflow

Pulling propeller
Optimum gear pod and strut shapes to further increase the propeller efficiency.
Enhanced Middle Body Interaction

- Optimum, large gear pod does not restrict optimum gear design for sufficient torque.
1. Slow, large propellers
   - The power sharing – two gear contacts instead of one enable high torque
   - Large diameter gear pod allow large gear – further enhances the torque capability
2. Increased propeller disc area - twin propellers almost double the disc area
3. Retrieval of rotational energy - the aft propeller recovers the swirl of the front propeller
4. Pulling front propeller - undisturbed inflow
5. Gear pod interaction – further enhances the (front) propeller efficiency
Case Studies

2 DP-capable Offshore Supply Vessels

Operation profile:
- 14 hours loading at dockside
- 16 hours discharging on DP
- Sailing in and out
Case 1: Moderate speed PSV

- Power 2x2400 Hp Diesel drive
- Service speed 10 knots @ 50% MCR
- DP at 15% average power
Case 1: Moderate speed PSV

PSV 2x2385 Hp, 10 knots @ 50%, DP @ 15% power
Case 2: High speed PSV

- Power 2x3300 Hp Diesel electric
- Service speed 15 knots @ 90% MCR
- DP at 15% average power
Case 2: High speed PSV

PSV, 2x3300Hp, 15 knots @ 90%, DP @ 15% power

Fuel consumption=emissions vs standard-nozzle

sailing distance, nm

-25% -20% -15% -10% -5% 0% 5% 10%
Contra Rotating Propellers

Small propellers for shallow waters and ice operation

- Two propellers almost double the propeller disc area
Conclusion

- Operational profile – choice of propulsion
- Fuel economy and emissions
- Steerprop CRP gives good overall economy with adequate DP-capability for a variety of DP vessels